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# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Hand-Grips of Plastics Material for Handles for Digging and Shovelling Tools

We, FARBWERKE HOECHST Aktiengesellschaft, Vormals Meister Lucius & Brüning, a company recognized by German law, of, 6230 Frankfurt (M) — Hoechst, Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The present invention relates to plastics hand-grips for handles for digging and shovelling tools.

Tools such as shovels, spades and forks are generally provided with a wooden handle, and in some cases with a handle consisting of a metal tube. For better handling, the upper end of the handle is often mounted with a T- or D-shaped hand-grip. Such hand-grips are generally also of wood or metal. Recently, these hand-grips have also been formed from an appropriate thermoplastic material by injection moulding. Especially suitable for this purpose are rigid polyolefines for example polypropylene or rigid polyethylene. These hand-grips of plastics material have the advantage over wooden hand-grips that they can be produced in an economical manner in the same shape and quality and in different colours, and that they do not tend to rot. In comparison with varnished or lacquered iron hand-grips, they are advantageous in that they have a lower weight and an increased corrosion resistance.

30 The hand-grip is secured to the wooden handle in a manner such that the handle is firmly inserted into the hand-grip, and the latter is nailed to the handle. The lower end of the hand-grip is in the form of a sleeve which exactly fits the part of the upper portion of the handle. In some cases hand-grip and handle are additionally bonded together, or undercuts in the hand-grip and corresponding grooves in the handle are provided to engage each other. Unfortunately, it is difficult to fix polyolefines by bonding owing to the fact that

they are very resistant to solvents. Virtually, only an adhesion bond can be obtained which in the long run, however, does not withstand the heavy mechanical stress exerted on the tools. Hand-grips which have been nailed to the handles loosen after a prolonged time of use, so that the tool is no longer effective.

50 The present invention is based on the observation that a very durable and long-lasting bond between the hand-grip and the handle of a digging or shovelling tool can be obtained by applying the hand-grip to the handle in the mould of an injection moulding machine by the injection moulding of the hand-grip itself.

55 This may be carried out by placing an exactly fitting handle of wood or metal in a corresponding opening in the injection mould in a manner such that the plastic material which is injected into the mould flows around the end of the handle, and surrounds it like a sleeve, over a determined length of advantageously more than 40 mm. The liquid plastic material used is a rigid polypropylene, which penetrates superficially, for example, in the case of wood into the pores of the wood where by a solid substantially undetachably bond between the polypropylene and the wood or a corresponding metal handle is obtained.

60 If a metal handle is used, the latter must be closed at its upper end. In order to strengthen the bond between the hand-grip and the handle, the latter may advantageously be provided with longitudinal and transverse effects in the form of, for example, grooves or cams at the places where it is surrounded by the polypropylene in order to prevent shifting or twisting of the plastics hand-grip when it is being used.

65 It is advantageous to use isotactic polypropylene having a density of at least 0.94 g/cm<sup>3</sup>. It is also advantageous to use a polypropylene whose low temperature impact strength has been improved by adding 5 to 30% of an

5 amorphous polyolefine. As amorphous polyolefines, there may be added polyisobutylene or substantially amorphous copolymers of ethylene with at least one of its higher homologues.

10 The bond so obtained between the hand-grip and the handle of a shovel, spade, fork or similar tool is extra-ordinarily durable. It neither wobbles nor gets loose even after a prolonged time of use.

15 A hand-grip for handles for digging and shovelling tools made in accordance with the invention is illustrated diagrammatically by way of example in the accompanying drawing, in which Figure 1 shows a D-shaped hand-grip attached to the handle of a digging or shovelling tool, and Figure 2 shows a T-shaped hand-grip.

20- WHAT WE CLAIM IS:—

20- 1. A handle for digging and shovelling tools, wherein the hand-grip is formed from a polypropylene which has been applied to a handle of wood or metal by injection moulding.

2. A handle for digging and shovelling tools substantially as described herein with reference to and as shown in the accompanying drawing.

3. A method of forming a polypropylene hand-grip on a wooden or metal handle of a digging or shovelling tool, wherein the handle is placed in a corresponding opening in an injection mould for shaping the hand-grip, a portion of the end of the handle remote from the digging or shovelling portion of the tool is surrounded by the polypropylene in liquid state in such a manner that on cooling the polypropylene solidifies to form a hand-grip that is firmly bonded to the handle of the tool.

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COMPLETE SPECIFICATION

1 SHEET

*This drawing is a reproduction of  
the Original on a reduced scale*

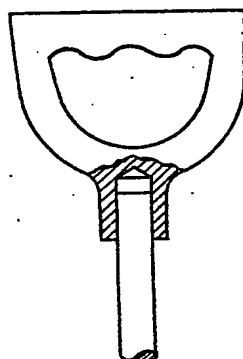


FIG. 1

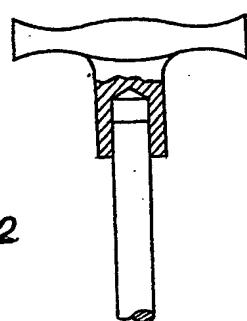


FIG. 2